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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/517,968	12/13/2004	Roger Boen	034299-611	1948

7590 09/04/2009  
Thelen Reid & Priest  
PO Box 640640  
San Jose, CA 95164-0640

EXAMINER
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KERNS, KEVIN P

ART UNIT	PAPER NUMBER
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1793

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09/04/2009

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/517,968	BOEN ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Kevin P. Kerns	1793	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 10 August 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 December 2005 and 29 December 2008 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1-6, 9, and 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Simcock (EP 0 403 138) in view of Rohn (US 2,090,074).

As to claims 1, 2, 9, 12, and 13, Simcock (EP '138) discloses a device and method capable for fusion and agitation on two immiscible phases. The device comprises a crucible (10), fusion and agitation means (16 and 18 of Figure 1; and column 2, lines 55-57), wherein the fusion means 16 comprises an inductor to supply alternating current at first and second frequencies, wherein the first is lower than the

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second (abstract). In addition, the device (of claim 1) includes respective power supply circuits to fusion means 16 and agitation means 18 that are connected to the induction melting apparatus, in which the circuits consist of separately powered and regulated melting and agitation power supply circuits (column 2, lines 54-58; and Figure 1).

Furthermore, the method for fusion and interfacial agitation of the diphasic system (of new claim 13) includes the steps of providing a composition of molten steel or other alloys within the crucible to be melted and agitated to ensure a homogeneous mixture between the first and second phases that would define an interface (heavier steel/alloy on the bottom of the crucible, with lighter slag/salt/flux toward the top of the crucible), and configuring the electrical supply circuit to include both fusion means 16 (i.e. first component) supplying variable current and agitation means 18 (i.e. second component) supplying variable current to be sufficient to melt and agitate, respectively, the contents of the first and second phases.

As to claims 3-6 and 14 (with method claim 14 corresponding to the device of claim 3), EP '138 discloses a capacitor (38), an induction generator (36), and a function generator (34) to supply a reference current to the induction generator 36 (column 3, lines 46-58; and Figure 1), in which the power source comprises the induction generator 36 configured to supply an oscillating circuit (defining a resonance frequency). In addition, the induction generator (36) is capable to generate 10 to 300 kW (or up to 500kW -- column 4, lines 34-40), the high frequency can be formed between 1 to 20 kHz (or 150Hz to 10kHz -- column 1, lines 54-57), and the low modulation frequency can be from 0.5 to 10 Hz (may typically be up to 50Hz -- column 1, lines 54-57).

Simcock (EP '138) does not specifically disclose that the current of the first and second components of the variable current are both generated by the (same) power source.

However, Rohn discloses a plural output power supply in the form of a single means for supplying alternating current of two different frequencies (see claim 4, as opposed to the two “means for supplying...” of claim 6) to induction coils in an induction furnace, or hearth 1 (column 1, lines 44-55; column 2, lines 1-55; claims 4-6; and Figure), in which the means for supplying alternating current comprises supplying a high frequency to provide desired heating/melting via a set of coils 2 and supplying a low frequency to provide desired stirring via another set of coils 4, such that the use of alternating current by a single means is advantageous for simultaneously melting metal and stirring molten metal, thus increasing equipment efficiency in view of the lower power consumption, and resulting in reduced mutual induction between these sets of coils (column 2, lines 1-8 and 49-55; and claims 4-6).

It would have been obvious to one of ordinary skill in the art at the time the applicants' invention was made to modify the induction melting and agitation crucible device and method for fusion and agitation of phases in the crucible, as disclosed by Simcock, by using the plural output power supply in the form of a single means for supplying alternating current of two different frequencies (high frequency for heating/melting, and low frequency for stirring), as taught by Rohn, in order to simultaneously melt metal and stir molten metal, thus increasing equipment efficiency in

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view of the lower power consumption, and resulting in reduced mutual induction between these sets of coils (Rohn; column 2, lines 1-8 and 49-55; and claims 4-6).

4. Claims 7, 8, 10, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Simcock (EP 0 403 138) in view of Rohn (US 2,090,074), as applied to claim 1 above, and further in view of Eckert (US 5,968,223).

Simcock (in view of Rohn) disclose and/or suggest the claimed invention above, but lacks the mentioning of one or more fluid conduits in contact with the crucible (claim 7), a resistance heater (claim 8), and a control mechanism comprising a screen or susceptor (to control thermal gradients) in the crucible (claims 10 and 11).

However, Eckert discloses a crucible (receptacle) for heating molten metal (abstract; column 1, lines 18-21; column 2, lines 29-62; column 3, lines 38-52; column 4, lines 12-42; column 5, lines 13-42; and Figure 1), in which the crucible includes a body of molten metal 8, a supply of fluxing gas 20 that serves as fluid conduits in contact with the crucible and flows through hollow tube 4 into molten metal 8 to treat it, and resistance baffle heaters 100 (that serve as screens/susceptors as a barrier to molten metal 8 flow through the exit bay 24) placed in the crucible to promote heating of the molten metal adjacent the exit (bay 24) prior to casting by both sides of the baffle heater (column 4, lines 12-21; and Figure 1), since the molten metal exiting the bay 24 is typically the “coldest” area in the bay (column 5, lines 30-36), thus controlling thermal gradients inside the molten metal 8 (first phase) containing fluxing gas 20 (second phase) via the baffle heater 100, such that these features are advantageous for

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supplying fluxing gas to treat the molten metal via an improved fluxing process, and for promoting uniform heating to the molten metal (abstract; column 1 lines 18-21; column 2, lines 29-62; and column 5, lines 30-36).

It would have been obvious to one of ordinary skill in the art at the time the applicants' invention was made to modify the induction melting and agitation crucible device and method for fusion and agitation of phases in the crucible, as disclosed by Simcock, by using the plural output power supply in the form of a single means for supplying alternating current of two different frequencies (high frequency for heating/melting, and low frequency for stirring), as taught by Rohn, in order to simultaneously melt metal and stir molten metal, thus increasing equipment efficiency in view of the lower power consumption, and resulting in reduced mutual induction between these sets of coils, and by further using the one or more fluid conduits in contact with the crucible (claim 7), a resistance heater (claim 8), and a control mechanism comprising a screen or susceptor (to control thermal gradients) in the crucible (claims 10 and 11), as disclosed by Eckert, in order to supply fluxing gas to treat the molten metal via an improved fluxing process, and to promote uniform heating to the molten metal (abstract; column 1 lines 18-21; column 2, lines 29-62; and column 5, lines 30-36).

### ***Response to Arguments***

5. The examiner acknowledges the applicants' amendment provided with the request for continued examination received by the USPTO on August 10, 2009. The

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combination of the amendments and page 6 of the remarks section are sufficient to overcome the 35 USC 103(a) rejections based on the lack of teaching of both heating/melting and stirring within the disclosure of the Cartlidge et al. reference. Upon review, the newly applied Rohn reference is combined with Simcock under 35 USC 103(a), as Rohn discloses both high frequency melting and low frequency stirring provided by a means for supplying alternating current (see above section 3 of the 35 USC 103(a) rejections section for details). Claims 1-14 remain under consideration in the application.

6. Applicants' arguments with respect to claims 1-14 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin P. Kerns whose telephone number is (571)272-1178. The examiner can normally be reached on Monday-Friday from 8:00am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jessica Ward can be reached on (571) 272-1223. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Kevin P. Kerns  
Primary Examiner  
Art Unit 1793

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Primary Examiner, Art Unit 1793  
August 27, 2009